

## Direction of Future Work of GRE

### Signalling Requirements for Automated /Autonomous Vehicles

#### 1. Background

GTB briefed GRE, at its 79th session, on the issues that had been addressed at the GTB forum on lighting for automated vehicles in February 2018. GTB provided the informal document [GRE-79-35](#) summarising the worldwide activities of various governmental, standardisation and industry groups. Additionally GTB introduced informal document [GRE-79-36](#) providing a short overview that was prepared for discussion by WP.29 AC.2 at its March 2018 session..

At the June 2018 session of the WP.29 IWG on Intelligent Transport Systems and Automated Driving GTB was invited to present the document [ITS AD-15-05](#) “GTB presentation for 15th ITS-AD on ADS lighting and signalling”.

Subsequently, at the 1st session of the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) in September 2018, items.4 and 5 of its agenda relating to “Exchange of views on vehicle automation related work priorities” were discussed. GTB introduced informal document [GRVA-01-06](#) (Considerations Concerning Lighting and Light-Signalling) and proposed that the topic should be added to the list of priorities. The conclusions of GRVA, relating to the need for AV’s to provide signals to indicate their status and intended actions were as follows (based upon GTB notes and awaiting confirmation by the official report):

- a) The topic of signals, to indicate the status and intended actions of AV’s, is outside of the scope of GRVA and will not be included in the list of work items to be submitted to WP.29 for its 176<sup>th</sup> session in November 2018..
- b) If research findings identify that signals (visual, audible, or a combination) are required, the lighting specific technical requirements will be identified by GRE and GRVA will have the responsibility to define the characteristics of the control signal.

While GRVA has concluded that the topic is currently outside its scope, the original question posed by GTB (informal document [GRE-79-36](#)) is unanswered. The concern remains that the opportunity to create a global solution will be lost as national and standardisation groups reach their own conclusions. Consequently, it may be appropriate for GRE to consider taking charge of this subject by establishing (or supporting) an activity to encourage the various stakeholders to cooperate, with a view to identifying a common approach.

In addition to the work of WP.29 and its expert groups, WP.1, at its 77th session (18-21 September 2018), has adopted the WP.1 resolution on the deployment of highly and fully automated vehicles in road traffic as Annex 1 ([ECE/TRANS/WP.1/165](#)). Annex 1, item 4(h) states: “4. *Automated driving systems in highly and fully automated vehicles should: (h) Communicate with their users and other road users, in a clear, effective and consistent way, by providing sufficient information about their status and intention, and enabling an appropriate interaction*”. Clearly this contribution from WP.1 shall be taken into account.

GTB concludes that answers are required to fundamental questions such as

- (i) What are the human factors to be taken into account? (Can light help other road users to avoid uncertainty or fear associated with the activities of AV’s.?)
- (ii) Is there a safety requirement for AV’s to provide signals to indicate their status and to communicate their next intended actions? If so shall such signals be visual, audible, or a combination?
- (iii) How to address the night vision aspects associated with the operation of AV’s? (e. g. light distribution designed for camera needs)

## 2. Proposal

Taking account of the concern that the opportunity to consider a global solution, if deemed necessary, will be lost as national and standardisation groups reach their own conclusions; GTB would like to propose that GRE establishes a Special Interest Group to answer the fundamental questions identified above.

GTB is willing to actively participate in a GRE Special Interest Group along with other interested stakeholders. The GTB contribution would include research to assist GRE to reach an informed decision on whether to proceed and coordinate its activities with GRVA.

Alternatively, GTB is prepared to open its (already active) Special Interest Group to all interested CP's and other stakeholders and to provide regular progress reports to GRE. The meetings would provide opportunities to participate via WebEx.